

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
9 October 2003 (09.10.2003)

PCT

(10) International Publication Number
WO 03/083857 A1

- (51) International Patent Classification⁷: **G11B 20/00**, **G10L 19/02**
- (21) International Application Number: **PCT/IB03/00782**
- (22) International Filing Date: 26 February 2003 (26.02.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
02076203.5 28 March 2002 (28.03.2002) EP
- (71) Applicant (for all designated States except US): **KONINKLIJKE PHILIPS ELECTRONICS N.V.** [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **LEMMA, Aweke, N.** [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). **APREA, Javier, F.** [IT/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). **VAN DE KERKHOF, Leon, M.** [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).
- (74) Agent: **SCHMITZ, Herman, J., R.**; Internationaal Octrooibureau B.V., Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:**
— with international search report
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **DECODING OF WATERMARKED INFORMATION SIGNALS**

(57) **Abstract:** Method and apparatus are described for compensating for time offset in a received signal, so as to correctly align the frame sequence of a received signal to a sequence of transmitted symbols. Each symbol extends over T_s signal samples. The received signal is first divided into a sequence of frames of length T_s , and then each frame divided into a multiplicity of N_b sub-frames. Subsequently, N_b sequences of values are formed, where every successive value in each sequence is derived from the corresponding sub-frame within each successive frame. Each of the N_b sequences is an estimate for the correctly aligned sequence of transmitted symbols.

WO 03/083857 A1

INTERNATIONAL SEARCH REPORT

PCT/IB 03/00782

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 G11B20/00 G10L19/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G11B G10L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, INSPEC, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	VEEN VAN DER M ET AL: "ROBUST, MULTI-FUNCTIONAL AND HIGH-QUALITY AUDIO WATERMARKING TECHNOLOGY" PREPRINTS OF PAPERS PRESENTED AT THE AES CONVENTION, XX, XX, vol. 110, no. 5345, 12 May 2001 (2001-05-12), pages 1-9, XP001086463 the whole document	1,2, 11-13, 15-18
T	LEMMA A N ET AL: "A temporal domain audio watermarking technique" IEEE TRANSACTIONS ON SIGNAL PROCESSING, APRIL 2003, IEEE, USA, vol. 51, no. 4, pages 1088-1097, XP002242882 ISSN: 1053-587X the whole document	1-18

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

30 May 2003

Date of mailing of the international search report

17/06/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Quélavoine, R

INTERNATIONAL SEARCH REPORT

PCT/IB 03/00782

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 6 330 673 B1 (LEVINE EARL) 11 December 2001 (2001-12-11) abstract; figures 13,14 -----</p>	1-18

INTERNATIONAL SEARCH REPORT

on patent family members

PCT/IB 03/00782

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 6330673	B1	11-12-2001	AU	6516399 A	01-05-2000
			WO	0022772 A1	20-04-2000
<hr/>					